

REMARKS

By this amendment, a substitute specification has been submitted, corrected drawings are submitted in a separate submission, claims 1 and 4-8 have been amended, and claims 9-12 have been added to place this application in condition for allowance. Currently, claims 1-12 are before the examiner for consideration on their merits.

In the Office Action, the Examiner made a number of objections to the drawings and specification. The changes to the specification and drawings are believed to overcome each of the objections made to the specification under 35 USC §112, and the objections made regarding the drawings. Withdrawal of these objections is respectfully requested. Also, the objections to terminology in the claims have been overcome by the amendments made thereto.

In the prior art rejection, the Examiner rejects claims 1-4 and 8 under 35 USC §103(a) based on WO 99/63921 to Chmielewski et al. (Paragon) when taken in view of United States Patent No. 5,897,544 to Ronnberg. In this rejection, the Examiner alleges that Paragon teaches all of the claim limitations except for the elastic member as defined in the next to last clause of claim 1. In Paragon, the Examiner notes that elastic member 718 is employed to create the space 802. In response to this deficiency, the Examiner cites Ronnberg to allege that it is known to use lateral elastic members 36 or 37 to form an opening, see col. 5, line 35 et seq. The Examiner concludes that it would be obvious to modify Paragon and employ the lateral elastic members of Ronnberg, since each of the elastic members of Ronnberg and Paragon functions in the same way.

Claims 5-7 stand rejected under 35 USC §103 based on the combination of Paragon and Ronnberg, when further combined with United States Patent Publication No.

20020099351 to Onishi et al. The Examiner has taken the position that Onishi et al. teaches a diaper with two supplemental batt structures, and using two such structures in the diaper of Paragon as modified by Ronnberg is obvious.

Applicants respectfully traverse the rejection of the claims based on the combination of Paragon and Ronnberg. The bases for the traversal are: (1) the Examiner does not have the requisite motivation to modify Paragon; and (2) even if Paragon and Ronnberg are combined the invention is still not taught.

First, there are fundamental differences between Paragon and Ronnberg that would preclude one of skill in the art from modifying Paragon as alleged in the Office Action. On page 5 of Paragon, it is taught that the lower absorbent structure is given a curvature to separate the upper and lower structures, even in the absence of elastic at the waist flaps. On page 22, Paragon suggests that the upper absorbent structure could be curved in substitution of the lower absorbent structure, but that it is preferred to curve the lower structure. Thus, elastic is not even required to separate the structures.

Paragon also suggests the use of leg gatherers for each absorbent structure. Absorbent core 34 utilizes leg gatherers 501 and 502, with the upper absorbent structure 70 having its own leg gatherers 708. In the rejection, the Examiner has taken the position that one of skill in the art would somehow use lateral elastic members in place of the leg gathers 708 of Paragon. Applicants respectfully contend that the Examiner is using hindsight to engage in such a modification. Since the leg gathers 708 of Paragon perform a dual function, i.e., leg gathering and assisting in forming the opening 802, why would one of skill in the art remove the leg gathering feature from Paragon and replace it with lateral elastic members as suggested by Ronnberg? Such a modification would go against the

teachings of Paragon to have leg gathers for each absorbent core.

Further, one of skill in the art would not be motivated to merely add elastic members to Paragon since their function would be duplicative of that of the leg gatherers 708. Thus, there would be no reason to make this modification unless again one were to use hindsight, a practice impermissible in patent law.

Thus, the Examiner has not set forth the proper motivation to modify Paragon to arrive at the invention, and the rejection of claim 1 is flawed for this reason alone.

Notwithstanding the arguments made above, even, *assuming arguendo*, that motivation existed to include a lateral elastic member in the structure of Paragon, Ronnberg still fails to teach placement of the elastic member midway between the ends of the upper absorbent core of Paragon. Claim 1, as amended requires that the elastic member be placed midway between the ends of the supplemental absorbent batt structure, and this arrangement is not taught in Ronnberg. At best, Ronnberg teaches positioning the elastic members at the opening, and there is absolutely no suggestion whatsoever to put the elastic members anywhere else. Therefore, there is no basis for the Examiner to conclude that claim 1 is obvious over the combination of Paragon and Ronnberg.

The Examiner cannot baldly allege that it would be obvious to position the elastic member midway between the proximal and distal ends of the upper absorbent core of Paragon. To do so is the blatant use of hindsight, and such taints the rejection so that it could not be upheld on appeal.

Applicants also assert that claims 9, 10, 11, and 12 are separately patentable over the applied prior art. Claims 9 and 10 further specify that the elastic member is positioned between the basic and supplement batt structures of the claims. Like the positioning of the

elastic member midway between the proximal and distal ends, this arrangement is not taught or suggested in either Paragon or Ronnberg. In order to arrive at the invention of claims 9 and 10, one of skill in the art would have to add the elastic members of Ronnberg to Paragon, position them midway between each end of the upper absorbent core of Paragon, and further place it between the two cores of Paragon. There is absolutely no reason to make these changes, and claims 9 and 10 are separately patentable over the applied prior art.

Claim 11 differs from claim 1 by defining that the elastic member is positioned between the two batt structures. Claim 12 parallels claim 5 but is dependent on claim 11. As noted above, neither Paragon nor Ronnberg teaches positioning an elastic member between the upper and lower cores of Paragon or Ronnberg, and there is no factual basis to support a rejection of claims 11 and 12.

The remaining dependent claims 2-8 are patentable by reason of their dependency on claim 1.

In summary, by the amendments and arguments made above, each and every issue raised in the outstanding Office Action has been resolved. The changes to the drawing and specification remove all of the objections. Further, the Examiner has failed to establish a *prima facie* case of obviousness against claims 1 and new claims 9-12.

Therefore, the Examiner is respectfully requested to examine this application in light of this amendment, and pass claims 1-12 onto issuance.

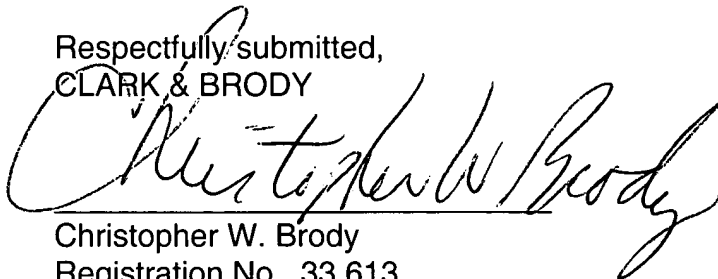
If the Examiner believes that an interview with Applicants' attorney would be helpful in expediting prosecution of this application, the Examiner is invited to telephone the undersigned at the number set forth below.

The above constitutes a complete response to all issues raised in the Office Action of August 11, 2004.

Again, reconsideration and allowance of this application is respectfully requested.

Please also charge any fee deficiencies or credit any overcharges to deposit account no. 50-1088.

Respectfully submitted,
CLARK & BRODY

A handwritten signature in black ink, appearing to read "Christopher W. Brody", written over a horizontal line.

Christopher W. Brody
Registration No. 33,613

Customer No. 22902
1750 K Street NW, Suite 600
Washington DC 20006
Telephone: 202-835-1111
Facsimile: 202-835-1755

Docket No.: 12010-0022
Date: November 9, 2004

IN THE DRAWINGS:

By separate submission, corrected drawings are submitted responsive to the points raised by the Examiner in the outstanding Office Action.

- 1 -

DISPOSABLE DIAPER

BACKGROUND OF THE INVENTION

This invention relates to a disposable diaper for
5 absorption and containment of body wastes and the like.

Japanese Patent Application A No. 1996-196565 discloses
a disposable diaper comprising a liquid-pervious topsheet, a
liquid-impervious backsheet and a liquid-absorbent core
interposed between these sheets. The core consists of an upper
10 layer core and a lower layer core. The upper layer core consists
of, in turn, a front core extending from a front waist region
toward a crotch region and a rear core extending from a rear
waist region toward the crotch region. In this diaper, a rear
end of the front core and a front end of the rear core are spaced
15 from each other in a longitudinal direction of the diaper by
a given dimension, and the topsheet covering the upper surface
of the upper core is folded back along the rear end of the front
core and the front end of the rear core toward the lower layer
core and tucked between the upper core and lower layer core.

20 In this diaper of well known art, a pocket is formed between
the front core and the lower layer core so as to open from the
front waist region toward the crotch region and another pocket
is formed between the rear core and the lower layer core so as

-2-

to open from the rear waist region toward the crotch region.
In this way, these pockets can receive feces.

However, the diaper disclosed in the above-cited Application has no arrangement for positively spacing the rear
5 end of the front core and front end of the rear core upward from
the lower layer core, so the rear end of the front core as well
as the front end of the rear core are apt to come in contact
with the lower core. Correspondingly, it is difficult for the
pockets to be sufficiently opened. With this diaper of well
10 known art, the quantity of feces which can be received within
these pockets even if the pockets are slightly opened. The
excessive quantity of feces may cling to a wearer's skin.

SUMMARY OF THE INVENTION

15 It is an object of this invention to provide a disposable
diaper improved so as to ensure that pockets are sufficiently
opened and thereby prevent any quantity of feces from clinging
to wearer's skin.

According to this invention, there is provided a disposable
20 diaper comprising a basic absorbent batt structure and at least
one supplementary absorbent batt structure. The basic
absorbent batt structure has a liquid-pervious body ~~faceing~~
faceable surface and a liquid-impervious garment ~~faceing~~ faceable

- 3 -

surface, and a front waist region, a rear waist region and a crotch region. The supplementary absorbent batt structure has a liquid-pervious body facing surface and an opposite lower surface, and a proximal end portion lying the front waist region and a distal end portion lying the crotch region, and being placed upon the body facing surface of the basic absorbent batt structure. The proximal end portion lies the front waist region while the distal end portion lies the crotch region.

An elastic member under an extension in a transverse direction extends in the transverse direction across the diaper along a zone of the distal end portion of the supplementary absorbent batt structure rather adjacent its proximal end portion and has its transversely opposite end regions substantially connected to the side edge regions of the basic and supplementary absorbent batt structures. Contraction of the elastic member causes the side edge regions of the supplementary absorbent batt structure to be pulled nearer to a longitudinal center line of the diaper so that the distal end portion of the supplementary absorbent batt structure curves so as to delineate a circular arc which is convex upward with respect to the body facing surface of the basic absorbent batt structure and consequently a pocket opening from the front waist region toward the crotch region is formed between the basic and supplementary absorbent batt

- 4 -

structure.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a partially cutaway perspective view showing
[[the]] a diaper as viewed from [[the]] a side of the topsheet;

5 Fig. 2 is a cross-sectional view taken along [[a]] the
line A - A in Fig. 1;

Fig. 3 is a cross-sectional sectional view taken along
a line [[B - B]] III - III in Fig. 1;

Fig. 4 is a perspective view and a partially
10 cross-sectional view showing the diaper of Fig. 1 as put on the
wearer's body with [[the]] front and rear waist regions connected
to each other;

Fig. 5 is a partially cutaway perspective view showing
another embodiment of the diaper;

15 Fig. 6 is a cross-sectional view taken along [[a]] the
line [[C - C]] VI - VI in Fig. 5;

Fig. 7 is a cross-sectional view taken along [[a]] the
line D - D in Fig. 5;

Fig. 8 is a perspective view and a partially sectional
20 view showing the diaper of Fig. 5 partially in a sectional view
as put on the wearer's body with the front and rear waist regions
connected to each other;

Fig. 9 is a partially cutaway perspective view showing

- 5 -

still another embodiment of the diaper; and

Fig. 10 is a cross-sectional view taken along [[a]] the
line [[E - E]] X - X in Fig. 9.

5 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Details of a disposable diaper according to this invention will be more fully understood from the description on an open-type diaper adopted as an exemplary case given hereunder in reference to the accompanying drawings.

10 Fig. 1 is a partially cutaway perspective view showing a diaper 1A as viewed from the side of a topsheet 2 and partially broken away, Fig. 2 is a cross-sectional view taken along [[a]] the line [[A - A]] II - II in Fig. 1, Fig. 3 is a cross-sectional view taken along [[a]] the line [[B - B]] III - III in Fig. 1
15 and Fig. 4 is a perspective view and a partially cross-sectional view showing the diaper 1A of Fig. 1 as put on a wearer's body with front and rear waist regions 20, 22 connected to each other. In Fig. 1, a transverse direction is indicated by an arrow X and a longitudinal direction is indicated by an arrow Y.

20 The diaper 1A comprises a liquid-pervious topsheet 2, a liquid-impervious backsheet 3, a liquid-absorbent first core 4 disposed between these two sheets 2, 3, a liquid-absorbent second core 6 wrapped by a liquid-pervious covering sheet 5,

- 6 -

and substantially liquid-impervious barrier cuffs 7. The topsheet 2, the backsheet 3 and the first core 4 constitute a basic absorbent batt structure 4A and the covering sheet 5 and the second core 6 constitute a supplementary batt structure 6A.

5 The diaper 1A is composed, in the longitudinal direction, of a front waist region 20, a rear waist region 22 and a crotch region 21 extending between the front and rear waist regions 20, 22.

The batt structure 4A has a body ~~fac~~ing faceable surface

10 4a defined by the topsheet 2 ~~4c above an upper surface of the~~
~~core 4~~ and a garment ~~fac~~ing faceable surface ~~4d beneath a lower~~
~~surface of the core 4,~~ 4b defined by the backsheet 3 and
longitudinally opposite ~~ends 4a~~ end portions 4c transversely
extending in the front and rear waist regions 20, 22 and

15 transversely opposite side edge portions ~~[[4b]]~~ 4d
longitudinally extending between these two ~~ends 4a~~ end portions
4c. A pair of end flaps 8 transversely extends ~~along~~ between
the respective ~~ends 4a~~ end portions 4c and the associated end
portions of the core (4). A pair of side flaps 9 longitudinally

20 extends ~~along~~ between the side edge ~~portion 4b~~ portions 4d and
the associated side edge portion of the core (4). In the crotch
region 21, the side flaps 9 curve inwardly in the transverse
direction of the diaper 1A so as to delineate circular arcs,

- 7 -

respectively.

The batt structure 6A has a body ~~facing~~ faceable surface above 6a defined by an upper ~~surface-6e~~ portion of the ~~second core-6~~ covering sheet 5 and an opposed lower surface ~~6d beneath~~ 6b defined by a lower portion ~~surface~~ of the covering sheet 5 ~~second core-6~~ and is placed upon the body facing surface ~~[[4c]]~~ 4a of the batt structure 4A and extends from the front waist region 20 toward the crotch region 21. The batt structure 6A has a proximal end portion ~~[[6a₁]]~~ 6c placed upon the ~~end-4a~~ side edge portion 4c of the batt structure 4A in the front waist region 20, a distal end portion ~~[[6a₂]]~~ 6d lying in the crotch region 21 and transversely opposite side edge ~~portion-6b~~ portions 6e placed upon the respective side edges ~~4b~~ edge portions 4d of the batt structure 4A and longitudinally extending between these two end portions ~~6a₁, 6a₂~~ 6c, 6d.

~~In the diaper 1A,~~ ~~[[the]]~~ The one end ~~[[4a]]~~ 4c of the batt structure 4A and the proximal end portion ~~[[6a₁]]~~ 6c of the batt structure 6A are joined to each other by means of the topsheet 2 and the ~~liquid-pervious~~ covering sheet 5. The transversely opposite side edge portions ~~[[4b, 6b]]~~ 4d, 6e of ~~these~~ the batt structure 4A, 6A, respectively, are joined together also by means of the topsheet 2 and the ~~liquid-pervious~~ covering sheet 5.

- 8 -

~~In the diaper 1A, a~~ A first elastic member 10 under an extension in the transverse direction extends across the diaper 1A ~~along a zone of~~ midway between the proximal end portion 6c and the distal end portion ~~[[6a₂]]~~ 6d of the batt structure 6A rather adjacent its proximal end portion 6a₁. ~~This~~ while this first elastic member 10 lies between the topsheet 2 and the upper portion of covering ~~the liquid pervious~~ sheet 5 and has its transversely opposite end portions 10a lying on the side edge portions ~~[[4b, 6b]]~~ 4d, 6e of the batt structure 4A, 6A, respectively, are joined to the topsheet 2 and the ~~liquid pervious~~ covering sheet 5 by means of hot melt adhesive (not shown). Substantially, the transversely opposite end portions 10a of the first elastic member 10 are connected to the side edge portions ~~[[4b]]~~ 4d of the batt structure 4A and to the side edge portions ~~[[6b]]~~ 6e of the batt structure 6A.

~~In the diaper 1A, contraction~~ Contraction of the first elastic member 10 causes the side edge portions ~~[[4b]]~~ 4d of the batt structure 4A and the side edge portions ~~[[6b]]~~ 6e of the batt structure 6A to be pulled nearer to a longitudinal center line Z of the diaper 1A. Consequently, the zone of the batt structure 4A underlying the distal end portion ~~[[6a₂]]~~ 6d of the batt structure 6A curves so as to delineate a circular arc which is convex downward with respect to the lower surface ~~[[6d]]~~ 6b

- 9 -

of the batt structure 6A while the distal end portions ~~[[6a₂]]~~
6d of the batt structure 6A curves so as to delineate a circular
arc which is convex upward with respect to the body ~~faceing~~ faceable
surface ~~[[4c]]~~ 4a of the batt structure 4A. Between the batt
5 structure 4A, 6A, a pocket P1 with an opening from the front
waist region 20 toward the crotch region 21 is formed.

Each of the cores 4, 6 comprises a mixture of fluff pulp
and super-absorbent polymer particles or a mixture of fluff pulp,
super-absorbent polymer particles and thermoplastic synthetic
10 resin ~~fiber~~ fibers compressed to a desired thickness.
Preferably, the cores 4, 6 are entirely covered with a tissue
paper in order to prevent the polymer particles from leaking
out and/or to prevent the cores 4, 6 from being deformed. The
polymer particles may be selected from ~~[[a]]~~ the group consisting
15 of starch-, cellulose- and synthetic-polymer particles.

The barrier cuffs 7 lie on the side flaps 9 and extend
in the longitudinal direction. The cuffs 7 respectively have
proximal edge portions 7a extending in the longitudinal direction
immediately outside the transversely opposite side edge portions
20 ~~[[4b]]~~ 4d of the batt structure 4A, distal edge portions 7b
extending in parallel to the proximal edge portions 7a and
normally biased to rise ~~[[on]]~~ up above the body ~~faceing~~ faceable
surface ~~[[4c]]~~ 4a of the batt structure 4A and longitudinally

- 10 -

opposite fixed end portions 7c lying in the front and rear waist regions 20, 22 and collapsed inwardly in the transverse direction of the diaper 1A. The cuffs 7 respectively have the proximal edge portions 7a joined to the side flaps 9 and the fixed end portions 7c joined to the end flaps 8.

The cuffs 7 further include lateral ~~regions~~ portions 7d extending transversely outward from the respective proximal edge portions 7a. The distal edge portions 7b are provided with elastic members 11 extending in the longitudinal direction and bonded under extension to the respective distal edge portions 7b. The elastic members 11 are covered with parts of the respective distal edge portions 7b.

The diaper 1A curves in the longitudinal direction with the topsheet 2 inside and contraction of the elastic members 11 causes the distal edge portions 7b of the cuffs 7 to rise up above ~~[[on]]~~ the body ~~faceing~~ faceable surface ~~[[4c]]~~ 4a of the batt structure 4A. In the front waist region 20, the distal edge portions 7b of the cuffs 7 rise ~~[[on]]~~ up above the body ~~faceing~~ faceable surface ~~[[6c]]~~ 6a of the batt structure 6A.

The end flaps 8 are provided with belt-like elastic members 12 extending in the transverse direction and bonded under extension to the respective end flaps 8 so as to be operatively associated with a waist-hole. In the crotch region 21, the side

- 11 -

flaps 9 are respectively provided with a plurality of elastic members 13 extending in the longitudinal direction and bonded under extension to the respective side flaps 9 so as to be operatively associated with leg-holes.

5 In the rear waist region 22, proximal end ~~regions~~ portions of tape fasteners 14 are joined to the respective side flaps 9 so that these tape fasteners 14 may extend transversely inward. The tape fasteners 14 are coated on their ~~[[free]]~~ distal end ~~regions~~ portions with adhesive (not shown). In the front waist
10 region 20, the backsheet 3 is provided on its outer surface with a rectangular target tape strip 15 formed of a plastic film and serving as a landing zone for the tape fasteners 14.

 In the end flaps 8, longitudinally opposite end ~~regions~~ portions 2a of the topsheet 2 as well as longitudinally opposite
15 end ~~regions~~ portions 3a of the backsheet 3 extend longitudinally outward beyond the longitudinally opposite ends ~~[[4a]]~~ of the ~~batt structure 4A~~ core 4 and are overlaid and joined to each other as will be best seen in Fig. 2. Longitudinal end regions 5a of the ~~liquid-pervious~~ covering sheet 5 forming the ~~fixed~~
20 end ~~6a~~ proximal end portion 6c of the batt structure 6A are overlaid and joined to each other as well as to the associated end ~~regions~~ portions 2a of the topsheet 2. The longitudinally opposite fixed end ~~regions~~ portions 7c of the cuffs 7 are joined

- 12 -

to the respective end ~~regions~~ portions 5a of the ~~liquid-pervious~~
covering sheet 5. The elastic members 12 operatively associated
with the waist-hole are interposed between the end ~~regions~~
portions 2a of the topsheet 2 and the end ~~regions~~ portions 3a
5 of the backsheet 3, respectively, and joined to these end ~~regions~~
portions 2a, 3a.

In the side flaps 9, transversely opposite side edge
~~regions~~ portions 2b of the topsheet 2 forming parts of the side
edge portions [[4b]] 4d of the batt structure 4A and transversely
10 opposite side edge ~~regions~~ portions 3b of the backsheet 3 as
well as the lateral ~~regions~~ portions 7d of the cuffs 7 extend
transversely outward beyond the side edge ~~regions~~ portions 2b
of the topsheet 2, as will be best seen in Fig. 3. The side
edge ~~regions~~ portions 2b and the side edge ~~regions~~ portions 3b
15 are overlaid and joined to each other. The side edge ~~regions~~
portions 3b and the lateral ~~regions~~ portions 7d are overlaid
and joined to each other.

Transversely opposite side edge ~~regions~~ portions 5b of
the ~~liquid-pervious~~ covering sheet 5 forming the side edge
20 ~~regions-6b~~ portions 6e of the batt structure 6A are overlaid
and joined to each other, interposed between the side edge ~~regions~~
portions 2b of the topsheet 2 and the proximal edge portions
7a of the cuffs 7, and joined to the side edge ~~regions~~ portions

- 13 -

2b and the proximal edge portions 7a ~~[[of]]~~ on the backsheet 3, 7a. The elastic members 13 operatively associated with the leg-holes are interposed between the side edge ~~regions~~ portions 3b of the backsheet 3 and the lateral ~~regions~~ portions 7d of the cuffs 7 and joined to these ~~regions~~ portions 3b, 7d.

To wear the diaper 1A, the side flaps 9 in the rear waist region 22 are placed upon the outer side of the side flaps 9 in the front waist region 20 and the ~~free~~ distal end ~~regions~~ portions of the respective tape fasteners 14 are anchored on the target tape strip 15 by means of adhesive so as to connect the front and rear waist regions 20, 22 to each other. With the diaper 1A having the front and rear waist regions 20, 22 connected to each other in this manner, a waist-hole 16 and a pair of leg-holes 17 are defined, as shown in Fig.4.

With the diaper 1A put on a wearer's body, the batt structure 4A is normally in a state curving downward with respect to the lower surface ~~[[6d]]~~ 6b of the batt structure 6A while the distal edge portion ~~[[6a₂]]~~ 6d of the batt structure 6A is normally in a state curving upward with respect to the body facing surface ~~[[4c]]~~ 4a of the batt structure ~~[[4]]~~ 4A. In this way, the pocket P1 is sufficiently opened to ensure a desired high level of capacity of this pocket P1 for feces.

Even when a large quantity of loose passage or watery feces

- 14 -

is discharged on the diaper 1A in the crotch region 21 and spreads on the topsheet 2 toward the front waist region 20, most of such feces can be received by the pocket P1 and it is not apprehended that such feces might migrate onto the batt structure 6A. This
5 diaper 1A therefore can reliably prevent, in the front waist region 20, any quantity of feces from clinging to a wearer's skin. After such feces have been received in the pocket P1, a water-content thereof is absorbed and retained by the batt structures 4A, 6A and a solid-content thereof is retained in
10 the pocket P1.

~~In the diaper 1A, preferably~~ Preferably an absorbing capacity for bodily discharges per unit area of the batt structure 6A is greater than that of the batt structure 4A. Of bodily discharges, urine is discharged onto the batt structure 6A and
15 then absorbed thereby. The batt structure 6A has the absorbing capacity for bodily discharges higher than that of the batt structure 4A so that most of urine can be absorbed and retained in the batt structure 6A. Therefore it is not apprehended that any significant quantity of urine once absorbed by the batt
20 structure 6A might flow into the pocket P1 and such urine might be mixed with feces within the pocket P1.

~~In this diaper 1A, the~~ The distal edge portions 7b of the respective cuffs 7 are elastically biased to rise up and to form

- 15 -

barriers against bodily discharges. In this way, the diaper 1A ensures to prevent bodily discharges from leaking sideways beyond the side flaps 9.

Fig. 5 is a partially cutaway perspective view showing another embodiment 1B of the diaper, Fig. 6 is a cross-sectional view taken along the line VI - VI in Fig. 5, Fig. 7 is a cross-sectional view taken along the line D - D VII - VII in Fig. 5 and Fig. 8 is a perspective view and a partially cross-sectional view showing the diaper 1B of Fig. 5 as put on a wearer's body with the front and rear waist regions 20, 22 connected to each other. In Fig. 5, a transverse direction is indicated by an arrow X and a longitudinal direction is indicated by an arrow Y. The diaper 1B shown in Fig. 5 is distinguished from the diaper 1A shown in Fig. 1 in that the diaper 1B includes a second supplementary absorbent batt structure 18A.

The batt structure 18A lies on the side of the body ~~faceing~~ faceable surface 4a of the batt structure 4A and extends from the rear waist region 22 toward the crotch region 21. The batt structure 18A has a proximal end portion 18c lying in the rear waist region 22 and placed upon the end ~~region 4a~~ portion 4c of the batt structure 4A, a distal end portion 18d lying in the crotch region 21 and transversely opposite side

- 16 -

edge portions ~~[[18b]]~~ 18e placed upon the respective side edge
~~regions 4b~~ portions 4d of the batt structure 4A and extending
in the longitudinal direction between the end portions ~~[[18a₁,~~
~~18a₂]]~~ 18c, 18d. The batt structure ~~[[18]]~~ 18A has a body facing
5 surface ~~[[18c]]~~ 18a and an opposite lower surface ~~[[18d]]~~ 18b
~~covered with the liquid pervious sheet 5~~ a covering sheet 23.
~~The liquid pervious sheet 5~~ covering sheet 23 is folded back
along the distal end portion ~~[[18a₂]]~~ 18d.

~~In the diaper 1B, one~~ One of the longitudinally opposite
10 ~~end region 4a~~ portions 4c of the batt structure 4A and the proximal
end portion ~~[[18a₁]]~~ 18c of the batt structure 18A are joined
together by means of the topsheet 2 and the ~~liquid pervious sheet~~
~~5~~ covering sheet 23. The transversely opposite side edge ~~regions~~
~~4b, 18b~~ portions 4d, 18e of the batt structure 4A, 18A are joined
15 together also by means of the topsheet 2 and the ~~liquid pervious~~
~~sheet 5~~ covering sheet 23.

~~In the diaper 1B, a~~ A second elastic member 19 under a
extension in the transverse direction extends across the diaper
1B ~~along a zone of~~ midway between the proximal end portion 18c
20 and the distal end portion [[18a₂]] 18d of the batt structure
18A ~~rather adjacent its proximal end portion 18a₁. This while~~
this second elastic member 19 lies between the topsheet 2 and
~~the liquid pervious sheet 5~~ an upper portion of covering sheet

- 17 -

23 and its transversely opposite end ~~regions~~ portions 19a lying on the side edge regions ~~4b, 18b~~ 4d, 18e of the batt structure 4A, 18A, respectively, are joined to the topsheet 2 and the ~~liquid pervious sheet 5~~ covering sheet 23 by means of hot melt adhesive (not shown). Substantially, the transversely opposite end ~~regions~~ portions 19a of the second elastic member 19 are connected to the side edge ~~regions 4b~~ portions 4d of the batt structure 4A and to the side edge ~~regions 18b~~ portions 18e of the batt structure 18A.

10 ~~In the diaper 1B, the~~ The side edge regions 4b, 18b portions 4d, 18e of the batt structure 4A, 18A are pulled nearer to the longitudinal center line Z. As a result, the zone of the batt structure 4A underlying the distal end portion $[[18a_2]]$ 18d of the batt structure 18A curves so as to delineate a circular arc which is convex downward with respect to the lower surface $[[18d]]$ 18b of the batt structure 18A while the distal end portion $[[18a_2]]$ 18d of the batt structure 18A curves so as to delineate a circular arc which is convex upward with respect to the body ~~face surface 4e~~ faceable surface 4a of the batt structure 4A.

15

20 Between the batt structure 4A, 18A, a pocket P2 opening from the rear waist region 22 toward the crotch region 21 is formed.

A third core 18 of the batt structure 18A comprises a mixture similar to those forming the first and second cores 4, 6 and

- 18 -

is compressed to a desired thickness. Preferably, the third core 18 is entirely covered with a tissue paper.

~~In the diaper 1B, a~~ A length L1 by which the batt structure 6A extends from the front waist region 20 to the crotch region 21 is larger than a length L2 by which the batt structure 18A extends from the rear waist region 22 to the crotch region 21. The distal end portions ~~6a₂, 18a₂~~ 6d, 18d of the batt structure 6A, 18A, respectively, are spaced from each other in the crotch region 21 so that the body ~~face~~able surface ~~4e~~ 4a of the batt structure 4A ~~covered with~~ defined by the topsheet 2 is partially exposed between the distal end portions ~~6a₂, 18a₂~~ 6d, 18d. The body ~~face~~able surface ~~4e~~ 4a of the batt structure 4A is exposed in a zone of the crotch region 21 put aside to the rear waist region 22.

15 The end ~~regions 5a~~ portions 23a of the ~~liquid pervious sheet 5~~ covering sheet 23 forming a part of the proximal end portion ~~[[18a₁]]~~ 18c of the batt structure 18A are overlaid and joined to each other and joined also to the associated end ~~region~~ portion 2a of the topsheet, as will be best seen in Fig. 6. The
20 fixed end ~~regions~~ portions 7c of the respective cuffs 7 are joined to the respective end ~~regions 5a~~ portions 23a of the ~~liquid pervious sheet 5~~ covering sheet 23.

As will be seen in Fig. 7, the side edge ~~regions 5b~~ portions

- 19 -

23b of the ~~liquid pervious sheet 5~~ covering sheet 23 forming the respective side edge ~~regions 18b~~ portions 18e of the batt structure 18A are overlaid and joined to each other. These side edge ~~regions 5b~~ portions 23b are disposed between the respective
5 side edge ~~regions~~ portions 2b of the topsheet 2 and the respective ~~fixed side edge regions~~ proximal edge portions 7a of the cuffs 7 and joined to the side edge ~~regions~~ portions 2b and proximal edge portions 7a.

~~In the diaper 1B, the~~ The batt structure 4A curves so as
10 to delineate a circular arc which is convex downward with respect to the lower surface ~~[[18d]]~~ 18b of the batt structure 18A while the distal end portion ~~[[18a₂]]~~ 18d of the batt structure 18A curves so as to describe a circular arc which is convex upward with respect to the body ~~faceing surface 4e~~ faceable surface 4a
15 of the batt structure 4A. The pocket P2 formed between these batt structure 4A, 18A is largely opened. This diaper 1B allows feces to be received not only by the pocket P1 but also by the pocket P2. In this way, the diaper 1B ensures the receiving capacity for feces higher than that in the diaper 1A shown in
20 Fig. 1 and thereby reliably prevents any significant quantity of feces from leaking sideways beyond the end flaps 8 in the rear waist region 22. With this diaper 1B, it is not apprehended that any quantity of feces might cling to a wearer's skin in

- 20 -

the front waist region 20 as well as in the rear waist region 22.

Fig. 9 is a partially cutaway perspective view showing still another embodiment 1C of the diaper and Fig. 10 is a cross-sectional view taken along ~~a line E - E~~ the line X - X in Fig. 9. In Fig. 9, a transverse direction is indicated by an arrow X and a longitudinal direction is indicated by an arrow Y. The diaper 1C shown in Fig. 9 is distinguished from the diaper 1A shown in Fig. 1 in the arrangement as will be described below.

10 In this diaper 1C, the cores 4, 6 of the batt structure 4A, 6A are interposed between the top- and backsheets 2, 3. The topsheet 2 is folded back along the distal end portion ~~[[6a₂]]~~ 6d toward the side of the lower surface ~~[[6d]]~~ 6b of the batt structure 6A and tucked between the body ~~faceing surface 4e~~ faceable surface 4a of the batt structure 4A and the lower surface ~~[[6d]]~~ 6b of the batt structure 6A.

~~In the diaper 1C, the~~ The body ~~faceing surface 6e~~ faceable surface 6a of the batt structure 6A, a part of the lower surface ~~[[6d]]~~ 6b of the batt structure 6A ~~except the proximal end portion~~ 6a₁, and the body ~~faceing surface 4e~~ faceable surface 4a of the batt structure 4A are defined with the topsheet 2.

~~In the diaper 1C, the~~ The first elastic member 10 under an extension in the transverse direction extends across the

- 21 -

diaper 1C ~~along a zone of~~ midway the proximal end portion 6c
and the distal end portion $[[6a_2]]$ 6d of the batt structure 6A
~~rather adjacent its proximal end portion 6a₁.~~ The while the
elastic member 10 lies between the first core 4 and the second
5 core 6 and its transversely opposite end ~~regions~~ portions 10a
are joined to the side edge ~~regions 4b, 6b~~ portions 4d, 6e of
the batt structures 4A, 6A by means of hot melt adhesive (not
shown). The intermediate ~~region~~ portion extending between the
transversely opposite end ~~regions~~ portions 10a is joined to the
10 topsheet 2 by means of hot melt adhesive (not shown).

~~In the diaper 1C, the~~ The zone of the batt structure 4A
underlying the distal end portion $[[6a_2]]$ 6d of the batt structure
6A curves so as to delineate a circular arc which is convex downward
with respect to the lower surface $[[6d]]$ 6b of the batt structure
15 6A while the distal end portion $[[6a_2]]$ 6d of the batt structure
6A curves so as to delineate a circular arc which is convex upward
with respect to the body ~~face~~ faceable surface ~~4e~~ 4a
of the batt structure 4A. Between the batt structure 4A, 6A,
the pocket P1 opening from the front waist region 20 toward the
20 crotch region 21 is formed.

The topsheet 2 and the liquid-pervious sheet 5 may be formed
of a hydrophilic fibrous nonwoven fabric or a finely porous
plastic film. The backsheet 3 may be formed of a hydrophobic

- 22 -

fibrous nonwoven fabric, a liquid-impervious plastic film, two-layers of hydrophobic fibrous nonwoven fabric laminated with each other or a composite sheet consisting of a hydrophobic fibrous nonwoven fabric and a plastic film bonded to this
5 hydrophobic fibrous nonwoven fabric. The barrier cuffs 7 may be formed of a hydrophobic fibrous nonwoven fabric.

It is also possible to form the backsheet 3 and the leak[[-proof]] barrier cuffs 7 using a composite nonwoven fabric consisting of a highly water resistant fibrous nonwoven fabric
10 made by melt blown process which is sandwiched by two layers of fibrous nonwoven fabric having a good strength and flexibility made by spun bond method.

Nonwoven fabric used herein may be selected from [[a]] the group including those obtained by spun lace-, needle punch-,
15 melt blown-, thermal bond-, spun bond-, chemical bond- and air through-processes. Component ~~fiber~~ fibers of such nonwoven fabric may be selected from [[a]] the group consisting of polyolefine-, polyester- and polyamide-based fibers and core-sheath type or side-by-side type conjugated ~~fiber~~ fibers
20 of polyethylene/polypropylene or polyethylene/polyester.

Bonding of the top- and backsheets 2, 3, the liquid-pervious sheet 5 and the barrier cuffs 7 as well as attachment of the cores 4, 6, 18, and the elastic members 10,

- 23 -

11, 12, 13 to these top- and backsheets 2, 3 and liquid-pervious sheet 5 may be carried out using hot melt adhesive or welding technique such as heat-sealing or ultrasonic sealing.

5 This invention is applicable not only to the diaper of open-type but also to a diaper of pants-type having its front and rear waist regions previously connected to each other.

The disposable diaper according to this invention is primarily characterized in that contraction of the first elastic member causes the transversely opposite side edge regions of the supplementary absorbent batt structure to be pulled nearer to the longitudinal center line of the diaper, resulting in that the distal end portion of the batt structure curves so as to delineate a circular arc which is convex upward with the body facing surface of the basic absorbent batt structure. With this 15 diaper, the pocket with a large opening from the front waist region toward the crotch region is formed between these batt structures. This pocket has a sufficiently large receiving capacity for feces to prevent any significant quantity of feces from leaking out onto the latter batt structure and therefore 20 there is no anxiety that any quantity of feces might cling to a wearer's skin.

With the diaper according to another embodiment, the transversely opposite side edge ~~regions~~ portions of the basic

- 24 -

absorbent batt structure and the transversely opposite side edge
regions portions of the supplementary absorbent batt structure
are pulled nearer to the longitudinal center line as the first
elastic member contracts. As a result, the zone of the basic
5 absorbent batt structure underlying the distal end portion of
the latter batt structure curved downward with respect to the
lower surface of the latter batt structure while the distal end
portion of the latter batt structure curves upward with respect
to the body facing surface of the former batt structure. The
10 pocket formed according to this alternative embodiment can offer
an open space much larger than the pocket obtained by the
embodiment in which only the ~~free end region~~ distal end portion
of the latter batt structure curves upward with respect to the
body facing surface of the former batt structure.

15 With the diaper arranged so that the supplementary
absorbent batt structure has the absorbing capacity of bodily
discharges higher than that of the basic absorbent batt structure,
most of urine is absorbed and retained therein and to prevent
any quantity of the urine once absorbed in the supplementary
20 absorbent batt structure from migrating into the pocket and being
mixed with feces within the pocket.

With the diaper having, in addition to the basic and
supplementary absorbent batt structure and the second

- 25 -

supplementary absorbent batt structure, contraction of the second elastic member causes the transversely opposite side regions of the third core to be pulled nearer to the longitudinal center line so that the distal end portion of the second supplementary absorbent batt structure curves upward with
5 respect to the body facing surface of the basic absorbent batt structure. In consequence, the pocket with a sufficient opening from the rear waist region toward the crotch region is formed between the basic and second supplementary absorbent batt
10 structures to receive feces and thereby to prevent any quantity of feces from leaking out sideways beyond the end flaps in the rear waist region. With this diaper, there is no anxiety that any quantity of feces might cling to a wearer's skin in the front waist region as well as in the rear waist region.

15 The diaper according to still another embodiment having also, in addition to the basic and two supplementary absorbent batt structure, contraction of the second elastic member causes the transversely opposite side edge regions and the transversely opposite side edges of the second supplementary absorbent batt
20 structure to be pulled nearer to the longitudinal center line of the diaper. In consequence, the zone of the basic absorbent batt structure underlying the distal end portion of the second supplementary absorbent batt structure curves downward with

- 26 -

respect to the lower surface of the second supplementary absorbent batt structure while the distal end portion thereof curves upward with the body facing surface thereof. The pocket formed according to this alternative embodiment can offer an
5 open space much larger than the pocket obtained by the embodiment in which only the distal end portion of the second supplementary absorbent batt structure curves upward with respect to the body facing surface of the basic absorbent batt structure.